REPORT

OF

PROCEEDINGS

MEETING OF THE TRUSTEES

WESTERN WHITE PINE BLISTER RUST CONFERENCE

HELD IN

PORTLAND, OREGON,

DECEMBER 7, 1928.

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In the absence of the chairman, Mr. Charles A. Park, the meeting was called to order by Mr. H. P. Barss at 10 a.m. The first order of business was the reading of the following report of the President by the Secretary, Mr. C. S. Chapman:

REPORT OF PRESIDENT OF WESTERN WHITE PINE BLISTER RUST CONFERENCE

Mr. C. A. Park

This is the Eighth Annual Conference to consider Western needs in the matter of white pine blister rust control.

Following the practice of several years past this meeting was called as one of Trustees, but also following our usual practice we announced that everyone interested in the subject was welcome to attend and expected to take part in the proceedings. We again emphasize that we are meeting in an attempt to work out plans for the permanent good of this western country and the counsel and advice of all present is very much desired. Today you will hear from those who have been devoting their time and effort to the problem of blister rust control, since that disease was discovered here in the West in 1921. During this time the Government, states and private individuals have expended a very considerable sum to prepare for the time when the disease should appear in our commercial stands of white pine. This time has now arrived and I trust we are in a large measure prepared for the situation confronting us.

Up to the present time I feel that this Conference has been very successful in securing the wherewithal to do those things which it has been felt should be done. Its recommendations have been clean cut and specific and have met with the approval of the Bureau of Plant Industry, Office of Blister Rust Control, and Congress. But today we face a difficult situation. We have white pine blister rust in Washington, Idaho and Oregon. It only remains to reach California and the bulk of our states will have been invaded. In fact we have the situation we had hoped would not be upon us for several years to come.

In what way must our program now be changed? Does our preparatory work clearly point the way to future activities? And to what extent must we be guided by economic conditions which exist in our various forest

regions? These are the questions as I see it which we must discuss today and attempt arrival at some feasible solution. I have no doubt but that a program acceptable to all concerned may be formulated and carried through in a manner to safeguard some of our principal tree species.

If the means are not available for the program it is felt should be carried out, then as has been the case in the past, we should not hesitate to make this fact plain to Congress and our various states, with the expectation they will be guided by the findings of those who have devoted their time and effort to this work the past eight years.

In conclusion may I express the confidence we feel in the Government and state officials who have each year brought to us the results of their findings, and for the excellent spirit in which they have received our suggestions and sometimes our criticisms.

I look to a continuation of the cooperative and mutual helpfulness which has characterized our efforts up to the present time and to a plan of future operations which will be financially feasible and technically sound.

MESSAGE TO WESTERN WHITE PINE BLISTER RUST CONFERENCE

from

Mr. S. B. Detwiler

I very greatly regret my inability to be present at the Western Blister Rust Conference this year when the practical problem of controlling the rust in the West must be faced in dead earnest. Although the spread of the rust has been more rapid than was anticipated in 1923, when the Ten-year Control Program was launched, in general the situation that now exists was exactly foreseen. The plans for the first half of the program have adequately met the needs for developing feasible means of combating the rust, the time has now arrived when this knowledge now at hand must be applied in a wise, practical manner, with courage and conviction.

We are all agreed that the present and future values at stake in our fight against the blister rust, make it a matter of public as well as private welfare to wage an aggressive, relentless and intelligent warfare against this destroyer.

The Conference may well look with pride upon its own initiative and leadership in inaugurating the Ten-year Control Program, in 1923. I feel personally that in spite of the very grave situation that exists, practical control work has reached the stage where we can feel assured of averting great loss, provided the energetic leadership of the Western Blister Rust Conference continues. I have faith that at this year's Conference a broad and effective

plan and program will be developed to adequately meet the needs of the situation as they now are known.

The present and future white pine values at stake warrant the Conference in taking an aggressive stand. The private interest in combating this destroyer is large, but is far over-shadowed by the public interest. I personally feel that to assure adequate future supplies of five-leafed pine timber, and to assure the maintenance of five-leafed pines for forest management purposes is a major conservation matter. It is a patriotic duty for this Conference to review what has been accomplished, consider present needs of the situation, and then provide means for meeting these needs.

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REPORT OF EXECUTIVE SECRETARY OF WESTERN WHITE PINE BLISTER RUST CONFERENCE

C. S. Chapman

This 1928 annual meeting of Trustees of the Western White Pine Blister Rust Conference should in many respects be the most important one yet held. Federal officials whom we have asked to come here today to tell us of their work will inform you that the blister rust has recently spread over the entire white pine belt of northern Idaho, and has progressed for a considerable distance through western Oregon toward the sugar pine stands of southern Oregon and of California.

It will be incumbent upon this meeting to discuss ways and means of securing the control of this disease before general damage to white pine occurs in north Idaho and adjacent localities. At our previous annual meetings we have had the reports of the Office of Blister Rust Control and the Office of Forest Pathology and have been kept informed of the progress of the experimental and investigative work under way. From the date of the discovery of blister rust in western North America, during the autumn of 1921, to the end of the Federal fiscal year which ends June 30, 1929, there will have been expended $1,273,500.00 of Federal funds upon this investigative work, scouting for the disease, the eradication of cultivated black currants, quarantine enforcement to prevent the artificial spread of the rust, and experimental work to develop methods for controlling the disease. In addition to this Federal expenditure, the western states and private interests concerned have expended approximately an equal amount. This large expenditure has been made to prepare for the situation we are facing today.

Through the means placed at their disposal specialists have perhaps by now prepared definite recommendations for the control of white pine blister rust in the West. It is my earnest hope that we shall today hear that the experimental program has progressed to such a point that we can consider a carefully thought-out program for blister rust control. And it is my further hope that if such a program is presented, the Trustees of the Conference, and others who are here today, will give it their best thought, both as to

its fundamental significance and as to ways and means of putting it into effect. We are now squarely faced with the alternative of undertaking control measures or of submitting to severe damage from this disease.

A recent inventory of white pine type acreage undertaken by the Forest Service, with the cooperation and assistance of the Office of Blister Rust Control, the several states and the timbermen concerned, informs us that there are, in round figures, 3,000,000 acres of white pine type in what is known as the Inland Empire white pine belt, comprising northwestern Montana, northern Idaho and northeastern Washington. Of this 3,000,000 acres of white pine type, 1,500,000 acres, or 50%, is owned by the Federal Government. The balance is owned by the several states and by the private timber interests. It is furthermore true that in most cases lands owned by anyone of these three types of ownership is not in solid blocks. We find numerous local areas within the boundaries of the national forests which are owned by private interests. Similarly, we find local areas owned by the states intermixed with areas in Federal or private ownership. From these facts, it becomes apparent that any program of blister rust control which is to be successful, and economically conducted, must necessarily have the support and cooperation of each type of ownership concerned. By its very nature, blister rust control can only be adequately applied over large and contiguous areas. The failure of any one type of ownership to cooperate must greatly reduce the effectiveness of any work which might be undertaken. I feel therefore that it is desirable and I hope feasible, to consider a program of control which will embrace the white pine areas as a whole, irrespective of ownership.

A control program of sufficient scope to meet the present situation necessarily involves the use of considerable funds. While funds must necessarily be forthcoming from each type of ownership if we are to successfully cope with this disease, we feel that it is incumbent upon the Federal Government to assume leadership in this respect as it has in laying the groundwork for control activities. Furthermore, the white pine growing industry now faces a serious emergency which was not and could not be foreseen a few years ago and with which it is in poor position to cope. I feel that first of all the Federal Government should take necessary steps to protect the 1,500,000 acres of white pine type in its possession in order that the present and future values in these lands shall not be lost to the nation as a whole. I further feel that the Federal Government should supply the requisite leadership in planning the control work on lands outside of the national forests and should also assist materially in bearing the burden of this expense. There are thousands of acres of land in the white pine type from which the virgin timber has been removed and upon which white pine reproduction of future value is now starting. In many cases it is extremely doubtful if the owners of such lands will be able to hold them until this new growth can be harvested. I greatly doubt if such owners should feel justified in supplying the entire cost of protecting this young white pine. The fact remains, however, that this reproduction represents a distinct asset to the country at large, in that it constitutes our future supply of white

pine, and hope for continued payrolls and industrial prosperity. From reports previously made we realize that damage to this reproduction by blister rust will be extremely severe and rapid unless control measures are put into effect. Its loss should in some way be prevented, but just as the public will be the principal beneficiaries so they must of necessity bear a principal part of the financial obligation involved. Action taken at this meeting and as a result of this meeting will no doubt to a considerable extent, determine whether or not we will get value received for the funds already spent upon experimental work. Failure to act upon recommendations based upon this experimental work will of course mean that funds expended to develop plans and recommendations will have been largely expended in vain.

I am in receipt of information from the Department of Agriculture at Washington, D. C., to the effect that the Budget which was presented to Congress on December 3 makes provision only for the continuation of the present experimental program by the Office of Blister Rust Control. It thus seems that no funds have been provided for the protection of white pine on the national forests, for which some $100,000 was asked, or to assist the states and other owners in protecting their lands, for which it was hoped some $100,000 would have been provided. The experimental and investigative work now under way should be carried forward to its logical completion. Consequently if control work is to be instituted, it is essential that this meeting discuss and formulate a program including the financial requirements of such a program. We must also remember that time is an important factor in this program. The rust will not wait. If control is to be effective, it must be applied in advance of severe infection rather than later.

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Mr. Barss: The report of the Secretary is a clear and concise analysis of the present situation which we must consider. Mr. Wyckoff will now give a report on the work of the Office of Blister Rust Control during the past year.

REPORT OF THE OFFICE OF BLISTER RUST CONTROL

by

Stephen N. Wyckoff, Senior Pathologist

For the past several years it has been my custom to explain in some detail the results and significance of the season's work, particularly that dealing with the development of local control practices. At this meeting, however, because of the situation now existing as a result of the rapid spread of the rust, it seems advisable to briefly summarize our work covering the past 5 years and discuss the high points in the results obtained, with special reference to their bearing on the future program for controlling the rust.

In order to fully understand the significance of the situation we face it is necessary to consider carefully the present distribution of white pine blister rust in Western United States. As the accompanying map shows, the disease has been found this year for the first time spread over the entire western white pine belt of western Montana, northern Idaho and north-

eastern Washington. Infections found in these regions are all on Ribes with the exception of one small focus of pine infection discovered during the spring of 1928 at Newman Lake, Washington. The infections on Ribes in the northern part of the white pine belt are very largely confined to Grossularia inermis, the most susceptible native species of Ribes known to occur in that region. The infections in the southern part are almost all on Ribes petiolare, which seems to rank higher in susceptibility than G. inermis.

The question at once arises as to the source of these infections on Ribes. We are not able to fully answer this point. The presence of the rust on pines at Newman Lake, however, makes it seem not at all impossible that there may be other such small focuses of pine infection in this region. Be that as it may, it is reasonably certain that a considerable number of pines which stand near Ribes on which the rust appeared this season have become infected. The important fact is that the rust has now entered and generally spread over the western white pine belt. Its effects will not be obvious for several years. But it will nevertheless be doing its work, will steadily become more firmly established and will finally result in wholesale damage to pine, unless the requisite steps are taken to control it.

A considerable extension of the rust was also found in western Oregon. We have found a well developed focus of pine infection on the western slopes of Mt. Hood, and Ribes infections, very largely on R. bracteosum, have been found as far south as the southern end of Lincoln County. It therefore appears that the rust has now spread one-half of the distance from the Columbia River to the California line. This means that the sugar pine stands of southern Oregon and California will not be free from danger of invasion for a much longer period.

Local Control

The presence of the rust in all parts of the western white pine belt makes imperative the development of definite plans for local control and the first steps in putting such plans into effect. The work of the Office of Blister Rust Control for 1928 has largely consisted of experimentation on those particular points upon which further information is urgently needed for local control work.

In light of the present situation, and based upon the results of our experimental work, a general program of control in Idaho, Montana and northeastern Washington appears necessary. This program should embrace the following important features:

A. Establishment of control.
   1. Ribes eradication and re-eradication in the stream type before heavy damage results.
   2. Ribes eradication in those reproduction and pole stands which will suffer damage before the Ribes are naturally eliminated.
   3. Ribes eradication in maturing stands where the number of Ribes is too great to allow the stand to mature without serious damage.

B. Maintenance of control.

1. Periodical checks of the stream type to maintain a Ribes-free condition.
2. (Coincident with B-1) Re-eradication in any reproduction, pole or maturing stands where this is necessary until natural control does its work.
3. Eradication on newly logged and burned areas, to be repeated until natural control starts.

Part one of this program consists of the establishment of the conditions of forest sanitation necessary to permit the maturing of pine now there or which will soon appear as reproduction. The most arduous part of this task, stream type eradication, is that which will afford the greatest degree of protection and which will be of greatest value in preventing the rapid intensification of the rust and the subsequent damage to pines both large and small. Stream type eradication is the immediate job which needs to be done. So far as such things can be put into definite figures, it is estimated that about 75% of the potential pine damaging power, as represented by Ribes, lies within the stream type. By the stream type is meant that narrow belt of land along the streams which supports a growth of hardwoods and brush and ordinarily contains a great many Ribes. It is in this narrow belt that Ribes obtain their greatest profusion, and it is there that the two most susceptible species of Ribes, R. petiolare and G. inermis, are found. The pine damaging power of these species, particularly where they grow in large concentrations in a moist habitat, will be very great indeed. It is estimated that in many cases they will be able to cause serious damage to pines for a distance of one mile from such concentrations. It is further recognized that the stream type Ribes constitute a serious menace not only to reproduction but to mature stands of timber which might be subjected to infection from them over a considerable period of years. By the rapid and wholesale eradication of these dense and large concentrations of very susceptible Ribes in the stream type the rate of establishment and intensification of the rust will be materially retarded, most mature stands of timber will be given all the protection necessary and the first and one of the most vital steps in the protection of young stands will have been taken.

It is for these reasons that the Office of Blister Rust Control definitely and urgently recommends the eradication of Ribes in the stream type of the western white pine belt, as the first step in establishing systematic control of the rust. In a report issued by this office under date of December 29, 1927 it was stated that the stream type very probably occupied about 3 per cent of the white pine type. Since that time we have secured further results which would seem to indicate that this percentage is slightly low. In order to serve as a basis for necessarily conservative estimates, we now prefer to state that the stream type occupies from 3 per cent to 5 per cent of the white pine type and that over the entire area it will probably average about 4 per cent. It must be recognized, however, that local areas can be found which will run as high as 10 per cent of stream type. On the other hand we possess numerous records of localities which contain no stream type. We feel that 4 per cent will constitute a fair average.

You will, of course, wish to know something of the cost of stream type eradication. This is a type of work which is expensive when figured against the acreage upon which the work is actually done. The costs, however, appear much more reasonable when they are distributed over the entire area for which the protection is designed. During the field season 1928 this office selected a half township of land near Bovill, Idaho as the scene of an experiment to determine the costs of, and improve the methods of performing Ribes eradication in stream type. This experiment was conducted in the east half of Township 41 north, Range 1 east. The stream type in this half township was carefully surveyed and the most effective methods of Ribes eradication then known were used. In some cases this consisted of chemical eradication and in other cases hand pulling methods were used. Upon the completion of the experiment, it was found that the half township, or 11,520 acres, contained 537 acres of stream type. It is thus seen that this stream type in this particular half township equalled 4½ per cent of the area. On the basis of the most effective methods known, the cost per acre for the stream type in this particular half township varied from $7.50 to $50.00, the average being $17.61. When this cost is properly charged to the entire area to which protection was given, it amounts to $.82 per acre.

We have also secured other information in regard to the percentage of stream type on fairly large forested areas. During the fall of 1928 a painstaking and accurate survey was made of 91,535 acres of land in the Musselshell Ranger District of the Clearwater National Forest. This survey, designed to serve as the basis of a working plan of actual eradication, showed that these 91,535 acres of forest land contained 2,965 acres, or 3+ per cent of stream type. This can be recognized as satisfactory corroborative evidence of the percentage figures stated above.

In considering the development of a control program, certain results from our experimental work should be clearly kept in mind. It must be remembered that the cost of protection work will always vary from one locality to another according to the local conditions. Or, to express the same thing in a different way, the cost of protection will vary with the different eradication types, and the proportion of these types will vary in different localities. The map which you here see is of a township in the Musselshell Ranger District of the Clearwater National Forest. The typing on this area was done by an intensive survey of the stream type, accompanied by our regular reconnaissance on the balance of the area. On this township the stream type represents 3½ per cent of the area. You can readily see, however, that parts of this area contain more stream type than others, that some portions might contain only 2 per cent of stream type, and others as much as 6 per cent. The intensive survey also shows that the cost per acre of the stream type will vary greatly, according to the degree of concentration of Ribes. It is thus readily apparent that costs for stream type eradication will vary within this one township.

The area known as the white pine belt represents in general three types of ownership, Federal, state and private. To insure the effectiveness of the proposed stream type eradication program, it should be undertaken simultaneously by all three types of owners in the same part of the white pine belt. Upon the recommendations of this office, the Forest Service is

planning stream type eradication to be first undertaken in the Clearwater National Forest. I merely touch upon this fact now, as Mr. Morrell will doubtless wish to tell you more about it. We recommended to the Forest Service that the first work be undertaken in the southern end of the white pine belt because of the numerous infections of Ribes found there and because of the presence of large and numerous concentrations of R. petiolare, the most susceptible species of wild Ribes and one which does not seem to occur in the northern end of the white pine belt. It is our urgent recommendation that a similar program be undertaken upon the other lands and that so far as possible a unified program be developed whereby work upon national forests and that upon other lands be done coincidently in the same localities, and that they progress together. Blister rust control of any type is most effective when applied over large areas of land. We are particularly impressed with the necessity for unification of effort, and we shall always recommend that, irrespective of land ownership, the control work be developed in a logical and orderly fashion. The unification of the control program will doubtless be a difficult problem to solve. We feel that this Conference is the organization best suited to aid in its solution, and we hereby present it to you with the earnest hope that you will give it your best thot and whatever effort is necessary to make it effective.

The second step in the establishment of control, namely, Ribes eradication in reproduction stands, will develop shortly after or in some cases coincident with stream type eradication. Our reconnaissance surveys and studies on the ecology of Ribes have convinced us that on areas within the white pine type natural conditions are working with us rather than against us, in that they are naturally tending to suppress Ribes. This process is the result of the natural competition between a dense and uniformly stocked stand of reproduction and such brush species as Ribes. We have found that in well and uniformly stocked stands of reproduction, Ribes are rapidly eliminated by this natural competition. The rate of elimination depends upon the degree and uniformity of stocking and the number of Ribes which occurred on the area at the time the reproduction started. We have found a great many stands of white pine reproduction 30-40 years old which are now almost free of Ribes. On the other hand there are numerous poorly stocked stands of this age, or much older, which still contain many of these plants. It is our proposal that we carefully watch the spread of the rust and that eradication in reproduction stands, as differentiated from the stream type, shall be performed only as necessary. This will permit us to take every advantage of the natural competitive process which is aiding us in our work. It will give the greatest possible elasticity to the control program. It means that we shall not have to recommend the expenditure of funds for timber type eradication in any localities before it is immediately necessary and that in many cases this protection cost will be lowered by waiting.

The third step in the establishment of control, Ribes eradication in older stands in which Ribes still persist will again develop shortly after or coincident to the stream type and reproduction eradication. We feel that the older stands of timber will in most cases derive adequate protection from the stream type eradication program. There will, however, be specific cases in which due to the openness of the forest stand and the consequent persistence of Ribes, eradication will be necessary to protect

larger timber which will not be logged for many years.

It is our feeling that the work designated under the general heading "maintenance of control" will, in the course of a number of years, become a standard part of forest protection in northern Idaho and adjacent regions. It seems probable that the maintenance of the proper Ribes-free conditions will in no case represent a cost as large as the establishment of these conditions. The probability exists that steady and persistent effort will lower the final cost, since by this means Ribes will never be given a chance to appear in large numbers.

In considering the problem of maintenance of control it should be remembered that part of this work will necessarily consist of Ribes eradication on areas where logging or forest fire has occurred. Disturbance of forest conditions from such causes is generally followed by the appearance of Ribes. Maintenance of control should include plans for systematic work on such areas, in order that their white pine productivity may be preserved.

Development of Local Control in the Sugar Pine Region

The rapid extension of the rust into western Oregon makes it imperative that we continue in an orderly but sufficiently rapid fashion the development of local control practices in the sugar pine belt. During the past three years this work has consisted of experimental Ribes eradication on the Stanislaus National Forest, and reconnaissance on the Stanislaus and Plumas national forests. It is our plan to steadily increase the size and scope of the experimental local control for the double purpose of investigating conditions in all parts of the sugar pine belt and of developing a personnel familiar with the region and with the methods of Ribes eradication which will be developed there. It is our further plan that reconnaissance be continued through the sugar pine belt. The value of reconnaissance in the western white pine belt in the development of the general local control plan has been so great that it seems particularly important to continue this work in California and southern Oregon.

During the past season 8,558 acres of land were worked by the experimental Ribes eradication unit on the Stanislaus National Forest, at an average cost of $1.00 per acre. This material reduction from the cost of $2.00 per acre secured in 1927 is partially the result of more favorable working conditions and also partially due to the development of better methods and a greater familiarity with the region by the men upon the work.

The Experimental Program

The control program outlined above is based upon the experimental work which has been done during the past few years. Several phases of this experimental work are still under way, and upon their completion will have direct bearing upon the methods and cost of control. Among the more important phases of experimentation from which further benefits will be derived are (1) the search for and investigation of more effective and cheaper chemicals for Ribes eradication, (2) a better understanding and use of

natural control as a factor in the program, to be gained only by continued ecological studies, and (3) experiments on methods of Ribes eradication, the scene of and opportunity for which will come from large scale control operations. The continuance of an aggressive policy of experimentation along these lines will result in further lowering of costs and increasing of efficiency of Ribes eradication. In addition, investigations of the causal fungus and its behavior should be continued as at present by the Office of Forest Pathology.

Cultivated Black Currant Eradication

The eradication of cultivated black currants has now been completed in Montana, Idaho and Oregon. The job is one-half to two-thirds done in California and should there be continued to completion. The State of Washington has been practically all worked over. But it has come to our attention that because of the favorable growth conditions for these plants in the Puget Sound region a considerable number of them are now growing there. In order to determine the facts of this matter, this office undertook a survey of the Puget Sound region during the summer of 1928. The results of this survey, made by a sample method, plainly indicate that most of eastern Washington contains only a very few of these plants. There seems to have developed, however, a rather considerable concentration of black currants in the extreme northwestern part of the State. Our survey shows that they are being replanted and grown there for commercial purposes. It is recommended that as soon as practicable the State obtain adequate legal authority and undertake the eradication of these plants.

The black currants in western Washington constitute a menace to the western white pine area in that these bushes will aid the rapid spread of the rust locally and will also be removed to other regions where they will be a further nuisance. Effective cooperation in this work awaits the enactment of a state black currant law under which the state can proceed with the elimination of these plants.

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Mr. Joy: Haven't we laws sufficient to enforce the eradication of the cultivated black currant in Washington?

Mr. Wyckoff: I do not know whether the law is sufficient. The attorney general should rule on this matter. Possibly compensation will be necessary.

Mr. Bush: Are black currants reproducing from the roots left in the ground?

Mr. Wyckoff: Very little.

Mr. Joy: The Canadian line is a very narrow line. Won't the rust come over the line even if the black currants are eradicated in Washington?

Mr. Wyckoff: We must stop somewhere.

Mr. Barss: Since a place at the end of the program has been assigned for discussion of the papers, we shall not discuss them individually now. In the present situation we have the advantage of having fulfilled our program as it was outlined in the ten year program. Nature is with us except for the stream type. Mr. Wyckoff brought out that we have a well organized and unified program. We must all get behind this program. We shall now hear from Mr. Lachmund on the investigative work carried out this last season by the Office of Forest Pathology.

INVESTIGATIVE WORK, 1928, OFFICE OF FOREST PATHOLOGY

by

H. G. Lachmund

Work in 1928 was concentrated upon the following main projects:

1. The study of the annual development and spread of the rust.
2. A study of the age of susceptibility in Ribes leaves.
3. Completion of the basis in the large scale study of susceptibility of the four main Inland Empire Ribes.
4. Enlargement of the study of the capacity of prickly currant (Ribes lacustre) and sticky currant (R. viscosissimum) to spread damaging infection to western white pine.
5. Size class damage study in western white pine.
6. Preparation for susceptibility tests of the main California Ribes associates of sugar pine.
7. Susceptibility tests of sugar pine and other species of white pine.

Annual Progress of the Rust

Unquestionably the outstanding development of the year 1928 in blister rust has been the southward spread of the rust found in the Inland Empire and in Oregon. The spread has been determined thru scouting by the Office of Blister Rust Control south of the International Boundary. Mr. Wyckoff has asked me to report the results of this scouting together with ours north of the line in the analysis of annual development and spread. It will be remembered that until 1928 the spread in 1927 was the most extensive on record. In 1928 notable discoveries of pine infection have been made both in the interior and in the coastal pine belts. In the former an advance pine infection center was found near Newman Lake some twenty miles northeast of Spokane on the western fringe of white pine in northeastern Washington. This brings the known range of the disease on pines for the first time across the border of the Inland Empire pine area. In the coastal white pine belt advance locations of pine infection were found in the Cascade Mountain region of northern Oregon on Larch Mountain and on Mt. Hood. The infection near Mt. Hood advances the known range of the rust on pines to within fifty miles of the northern limit of sugar pine.

Of far greater significance than the extension of the known range on pines, however, has been the forward sweep of the epidemic on wild Ribes. As may be seen from the map, this includes the main commercial range of western white pine in the Inland Empire and the territory practically border-

ing on the northern extension of the range of sugar pine in northern Oregon. This advance of the disease on Ribes is far less remarkable for its extent than for its intensity. In the Inland Empire most of the infection was found on wild black currant (R. petiolare), with smooth stem gooseberry (Grossularia inermis) next. In a number of places the infection was heavy. There were a total of 40 infection points in this region. In northern Oregon the rust was found at 64 points mainly on stink currants (R. bracteosum). This extraordinary spread is undoubtedly traceable to a number of causes.

The volume of aeciospore production within the main range of the disease to the north has been multiplying enormously each year. The period of this production has likewise been extended by the invasion by the disease of the higher elevations where spore production comes later.

Spore production must also have been increasing in the advance pine infection centers. Intensive and extensive scouting following the discoveries at Newman Lake, Larch Mountain, and Mt. Hood failed to uncover any additional centers. In spite of this, it is felt from the intensity of the disease on Ribes in several localities in the Inland Empire that there must be pine infection nearby. Past experience has shown that with the present intensity of scouting, new pine infection centers are not generally located until after the cankers have been producing aecia for several years and Ribes in the vicinity are well infected. It is highly probable that undiscovered centers of this character exist at a number of points scattered both in the Inland Empire region and in northern Oregon. It is manifestly impossible even in the most intensive scouting to find all infection points.

Increased aeciospore production in the advance pine infection centers and in the main range to the north would unquestionably increase the probabilities for Ribes infection in the Inland Empire and Oregon. In our opinion, however, the strongest reasons for the heavy infection manifested not only there but thru the entire southern portion of the range lay in the extraordinary favorableness of the season's weather conditions.

The beginning of the season closely resembled that in 1927. Spring was late and, as pointed out in last year's report, late springs result in bringing about a better coincidence of the period of aeciospore production in any locality with the occurrence of the early susceptible stages of development in local and more southern Ribes leaves. The period of maximum aeciospore production in 1928 occurred about the same time as in 1927 but was somewhat longer, extending from early May into the first of June. There were abundant moist periods during this time. The chief difference was that May was wet and June relatively dry in 1927, while the order was reversed in 1928, the wet period commencing in the latter part of May. Thus for the early portion of the period of maximum aeciospore dispersal in 1928, conditions were dry and favorable for the spores to be caught up and carried about by the winds. Since the winds accompanying the periods of dry weather and high pressure are largely from the north, an extraordinarily large volume of the spores must have been carried south. The early dry period was followed by general storms and rainfall. During rainfall spores in the air are undoubtedly caught up like other atmospheric dust and

precipitated. There were, therefore, in addition to the other favorable climatic factors, exceptionally favorable conditions for the southward dissemination of the spores and their deposit in southern territory.

Fall conditions for the transmission of infection from the Ribes to pines were moderately favorable. In the Inland Empire where the two hosts are generally in close association and in view of the extent and intensity of the rust's occurrence on Ribes, this is almost certain to result in a considerable spread to nearby pines and the permanent intrenchment of the disease at numerous points.

Age of Susceptibility in Ribes Leaves

In order to check the evidence of high susceptibility in the earlier stages of Ribes leaf development a systematic study was carried out this year. The results of this study indicated that Ribes leaf tissues attain the peak in susceptibility generally within eight to sixteen days after the leaves unfold from the bud. This information is directly applicable in the analysis of the effect of early seasonal conditions on long distance spread of the rust to Ribes.

Susceptibility of the Four Main Inland Empire Ribes

This study which was commenced systematically on a large scale in 1924 was drawn to a conclusion this year. The purpose of the study was to determine the reaction of the species to heavy infection conditions and their capacity to produce teliospores, the spore stage thru which the pine-infecting sporidia are produced. Three growth forms were recognized for each species - open, partial shade, and shade. The test involved a total basis of 3,349,264 leaves produced on a total basis of 3,604 plants. All were subjected to heavy infection by aeciospores. The average extent of susceptibility measured in percentages of total leaf area which become covered by infection for each form of each species is shown as follows:

	Species			
Growth Form	R.petiolare	G.inermis	R.viscosissimum	R.lacustre
Open	27.15	20.96	5.79	3.57
Partial shade	25.08	18.74	Insufficient basis	3.87
Shade	25.44	24.04	10.41	8.51

The percentages of total leaf area which bore telia were:

	Species			
Growth Form	R.petiolare	G.inermis	R.viscosissimum	R.lacustre
Open	23.98	9.65	2.88	.35
Partial shade	24.65	15.67	- -	.80
Shade	23.46	17.47	6.36	2.93

These figures, however, do not give the true relations between species for productivity of teliospores, for there were wide differences between species in the amount of teliospore production per unit of leaf area bearing

telia. A laboratory study has yet to be carried out to give final values for these differences. Rough preliminary laboratory estimates for the purpose of this meeting gave general relative values for productivity in bulk of telial spore horns or columns per unit of telia producing leaf surface as follows:

Growth Form	Species			
	R. petiolare	G. inermis	R. viscosissimum	R. lacustre
Open	100	60	10	5
Partial shade	85	70	- -	6
Shade	75	80	15	7

Multiplying these values by the figures for the average percentages of surface bearing telia, the final relative average values become:

Growth Form	Species			
	R. petiolare	G. inermis	R. viscosissimum	R. lacustre
Open	2,398	579	29	1.7
Partial shade	2,096	1,097	- -	4.8
Shade	1,759	1,398	95	20.5

This scale gives for the different species and forms a ready comparison of the relative estimated potential productivity of the pine-infecting spore stage. It is immediately apparent that the first two species are infinitely above the latter two in this respect. For example, R. petiolare, open form, is approximately 1,410 times more productive than R. lacustre, open form; approximately 83 times more productive than R. viscosissimum, open form; approximately 25 times more productive than R. viscosissimum, shade form, etc. The detailed laboratory study which will be made of a large basis of specimens collected for the purpose will give us more exact values for the average potential productivity in each form and species.

Study of the Capacity of R. lacustre and R. viscosissimum to Spread Infection to Pines

The results of the study of susceptibility taken in connection with general observations of spread to pines from varying degrees of Ribes infection give us a rough measure of the potential pine-infecting capacity of the different species. In the case of R. petiolare and G. inermis, this alone may be considered sufficient for application in the development of control measures. The character of infection on these two species and particularly R. petiolare places them in a class with other highly susceptible wild species and not far below R. nigrum from concentrations and plantings of which, respectively, extensive and damaging spread has occurred. In the dense concentrations in which these two species occur in the Inland Empire it is expected that they will cause damage to pine to distances up to a mile. There is no question of the necessity for their eradication under practically any condition if associated pines are to be protected.

For R. lacustre and R. viscosissimum at the other end of the scale in susceptibility and telial productivity, however, this is decidedly not the case. There is every reason to believe that where these species do not

occur in large numbers or where they are dying out thru shading the danger from them will be negligible. The question is, just how far is it safe to go in leaving these species under any particular set of conditions? For an answer it will be essential to know, in addition to their susceptibility, the degree and extent to which given amounts of infection on them will transmit the disease to the pines. In the general development of the control and investigative programs, the determination of this question has become the dominant phase of the investigations on Ribes.

The wide variation in conditions governing infection in different localities and different years makes a large basis of data essential for the establishment of reliable averages, and the latter are essential for application in control. Every effort is being made therefore to cover as wide a range in conditions as possible. In 1927 an intensive search was made for areas suitable for the study. It was found that such areas were exceedingly scarce in nature. The extension of the range and intensification of the disease which was found in the fall of that year opened up new territory for possible study areas. Search for them was continued in 1928, and by the fall of this year seven plots had been established, four containing prickly currant, two with sticky currant, and one with both species in association with western white pine.

Two of these are extensive infection areas. One plot 45 acres in extent is located at an elevation of approximately 2000 feet, about 7 miles north of Revelstoke, on the Columbia River. On this area the slope is medium steep and of westward exposure. The stand is composed mainly of young western white pines ranging between 0.5 and 40 feet in height, averaging 17 feet. The total number for the area is 6360. Part of the area is rather heavily grown up in mountain alder. Considerable amounts of R. lacustre (a total of 8,700 feet of live stem) are present mainly along a stream which runs thru the southern portion of the area. The rust got into this area in 1922. Only 33 pines have been found infected. The total number of cankers is 36. Most of the cankers are of 1922 origin. A few cankers are evidently of 1924 origin. These latter cankers are the only evidence of new infection since 1922. It is very evident that the intensification is progressing very slowly from the R. lacustre here. This is a hopeful indication. The area will be examined yearly for developments.

The other one of these two extensive plots is located in the headwaters country of the Birkenhead River at an elevation of about 3000 feet in the coastal mountains of British Columbia. It is about 45 acres in extent. The slope is medium steep and of eastward exposure. The stand is of mixed coniferous reproduction ranging mainly from 1 to 30 feet in height and of medium density. Western white pine makes up 30 per cent of the stand with 14,100 trees and white bark pine (P. albicaulis) 1.2 per cent with 540 trees. The area contains an estimated total of 3,200 plants of R. lacustre of 15,050 feet of live stem, 4,325 R. viscosissimum of 32,700 feet of live stem, and a few (100) bushes of R. sanguineum (the red flowering currant), a highly susceptible coast species, with 1,775 feet of live stem. Concentrations of the first two species are scattered here and there mainly in the southern portion of the area. Scattered bushes of R. viscosissimum are more or less general over the remainder. The few red flowering currants are

concentrated mainly in one location on the southern side of the plot.

The establishment of infection on pine on this area dates back probably to 1917 or 1918. Twelve western white and 18 white bark pines were found infected. The total number of cankers found was 77. Only one canker was found to indicate the original infection year. This was a very old canker on 1916 growth. The rest were younger and on younger growth. They fell mostly into three main age groups of 1920 or 1921 origin, 1923 origin, and 1926 origin. These years thus mark the main periods of intensification. Fifty-eight per cent of the cankers were on white bark pine and 27 per cent were concentrated about the location of the red flowering currant. Subtracting the infection found on white bark pine and that in the vicinity of the red flowering currant from the total, we have only 9 trees infected with a total of only 11 cankers. This may be considered the infection on western white pine due to spread from R. lacustre and R. viscosissimum. The figures are obviously too high since the heavier infection on white bark pine must have had an effect in the spread to western white pine, but they will serve for the purpose of discussion. Considering the amount of R. lacustre and R. viscosissimum and the length of time the rust has been present, this is certainly a very mild intensification. Damage from the established cankers would be entirely negligible. The results to date on these two plots here and at Revelstoke are encouraging.

In the five other plots established this year the spread of the rust to pines is being traced in each case from a definite center of a few infected bushes of either prickly or sticky currant to the surrounding pines. Other Ribes have been pulled out for a radius of 150 yards around these bushes to prevent complications. Due to the two to three-year incubation period of the rust on pines, results will not be available from these plots for several years.

Pine Size Class Damage Study

The studies of the spread of the disease from R. viscosissimum and R. lacustre to pines will give values for the number of cankers which may be expected to result within a specific time on associated pines by spread from given amounts of these Ribes under heavy infection conditions. It is next necessary to know the significance of cankers in terms of damage they will cause pines. This will obviously depend on the size and growth character of the trees, the numbers infected, and the number of cankers per tree. The individual canker will have a different value in any size class. For example, in a small tree one canker may be sufficient to kill or seriously injure; in a large tree 10 cankers may be required to accomplish the same result. Damage evaluation must therefore be based upon definitely established values for the number of cankers required on the average per tree to kill or seriously injure in the different size and growth character classes. For the purpose of determining these values a study was initiated this year at Brackendale, B. C. This study concerns primarily white pine on favorable sites. A basis of data has been secured on 199 trees to date, ranging from 5.5 to 43.7 feet in height. Segregating these into 5-foot height classes, the basis per class ranges from 11 to 42 trees. No basis was secured in trees under 5 feet in height, since general observations alone have been sufficient to show that one canker per tree will usually kill or seriously damage.

The study gives the following preliminary results:

Height Class Feet	Basis No. Trees	Average number of cankers required to kill or seriously injure per tree.
5.1 - 10.0	13	1.38
10.1 - 15.0	21	1.62
15.1 - 20.0	42	1.43
20.1 - 25.0	31	2.61
25.1 - 30.0	36	2.28
30.1 - 35.0	27	2.36
35.1 - 40.0	18	1.50
40.1 - 45.0	11	3.27

While the weakness of the basis for the purpose is very evident from the variations in the figures, the figures are nevertheless indicative. As was to be expected the trend is distinctly upward.

The basis was entirely insufficient to bring out the difference in the number of cankers required to kill or seriously injure in different growth character classes so no figures are given for this. The study will be continued next year.

Preparation for Susceptibility Tests of California Ribes

Last year a planting of a large quantity of root stocks and seedlings of the two outstandingly important Ribes associates of sugar pine in California was introduced to British Columbia for test. These were set out in the fall (some were kept in cold storage and set out this spring) and cared for this year, preparatory to tests for their susceptibility next year. Indifferent survival of the material was obtained. The year's experience, however, gave valuable information on conditions best suited to survival, and this fall another large lot of better material was imported to augment the stock already set out. Young sugar pines have been set out in close proximity to the plantings of these California Ribes, and it is planned to take data on the extent of spread from these Ribes.

Susceptibility Tests of Sugar Pine and Other White Pine Species

Eight species of white pines are being grown for test against the rust in British Columbia. We have at present a total of 8000 plants in our study beds and nursery. A special emphasis, of course, is being laid upon obtaining susceptibility data for sugar pine. As reported before the Conference in 1926, 50 odd sugar pines ranging from 4 to 8 years of age were imported from California and exposed to infection at Daisy Lake, B.C. These plants were alternately spaced with young western white pines of similar size taken from the forest nearby. Nine sugar pines became infected against 10 western white pines. The total number of cankers was 12 for sugar pine, and 14 for western white pine. These preliminary results seem to indicate a close similarity in the susceptibility of the two species.

Some interesting data are also available now from infection areas found in mixed western white and white bark pine. Comparisons of equal

bases of approximately equal sized trees of each species equally exposed to infection, the total basis being 32 trees ranging from 5 to 35 feet in height, show a susceptibility approximately 7 to 10 times greater in white bark pine than in western white pine.

General

Work has been continued on a number of minor projects including the study of susceptibility in other native Ribes species than the four noted earlier in this report, effect of squirrel work on cankers, canker growth, etc. These studies will be reported later when the bases are completed.

Plans for 1929

Work in 1929 will be centered primarily on the study of infection spread from R. lacustre and R. viscosissimum to pines and the tests of susceptibility in sugar pines and its two main Ribes associates. The collections of the regular records on annual development and spread of the rust will constitute the main project aside from these.

* * *

Mr. Barss: Mr. Lachmund has emphasized the wide variation in the susceptibility of the Ribes in the white pine type of the Inland Empire. He has shown that the two most susceptible species are in the stream type, thus further substantiating Mr. Wyckoff's recommendation that the stream type should be the first type eradicated, in order to obtain the greatest protection. Mr. Lachmund also emphasized the fact that his experiments have shown that the sugar pine is very susceptible to blister rust. We shall now have a paper on quarantine by Dr. Fracker, who is in charge of the enforcement of the domestic quarantines.

Mr. Fracker: I have been associated with the blister rust problem in the East from its inception. I have read the reports of the work here in the West so that I am fairly familiar with the whole problem.

BLISTER RUST QUARANTINE ENFORCEMENT

by

S. B. Fracker

The enforcement of the white pine blister rust quarantine during the past year has been materially affected by two important factors: first, the reorganization of the plant regulatory operations of the Federal Department of Agriculture; second, a general revision of the blister rust quarantine itself.

For several years the Department has been working toward a separation of the research work from the regulatory activities in which it is engaged. The first general move of this kind consisted of the establishment of the Food, Drugs and Insecticide Administration to relieve the Bureau of Chemistry of its law enforcement responsibilities and to combine the work of the former Insecticide and Fungicide Board with that of the enforcement of the Food and Drugs Act. That change became effective on July 1, 1927.

Following the same policy, the Secretary of Agriculture last year recommended to Congress that all the regulatory work connected with the "control and prevention of spread" of insect pests and plant diseases affecting the agricultural, horticultural and forest resources of the country be combined under one organization. This recommendation was adopted and a new bureau known as the Plant Quarantine and Control Administration was organized in the Department.

The new administration is in a sense the successor to the Federal Horticultural Board. That Board has carried the responsibility for enforcing the Plant Quarantine Act since the Act was passed in 1912. Its duties have included the preparation of quarantines and regulations for the Secretary's consideration and the administration of the port inspection and foreign quarantine services. It has also directly administered the domestic plant quarantines relating to cotton pests and to date palm scale insects respectively, and has enforced the Insect Pest Act of 1905 and certain other Federal statutes.

Other regulations governing interstate movement have been administered by the Bureaus of Entomology and Plant Industry in cooperation with the Board. The Bureau of Entomology has been in charge of work relating to the gipsy moth, European corn borer, Japanese beetle, and certain other important pests. The Bureau of Plant Industry has administered and enforced the white pine blister rust quarantine.

Effective July 1, 1928, all these activities have been centered in the Plant Quarantine and Control Administration, of which Doctor C. L. Marlatt has been made chief. A "Federal Plant Quarantine Board" of five members has been appointed to act in advisory capacity to the Administration.

The feature of this change of especial interest to this group today is the fact that the responsibility for enforcing the white pine blister rust quarantine devolves no longer on the blister rust organization with which you are well acquainted, but on the new Administration.

The same personnel has, however, largely remained in immediate field charge: Mr. R. A. Sheals, Providence, R. I. acting as supervisor in the eastern states, and Mr. C. R. Stillinger in the Northwest, with headquarters as before at Spokane.

The other change of broad significance has been a general revision of the blister rust quarantine regulations. What was probably the most important of the changes made in the revision related to the shipment of five-leafed pine trees. Instead of the zone system of control heretofore in effect, the movement of such pine nursery stock among infected states is now permitted on the basis of state nursery inspection and certain labelling requirements. In the case, however, of movement from the more heavily infected areas, namely the New England states, New York and Washington, into the ones less severely attacked, movement is permitted only from nurseries which have complied with the following sanitation requirements:

"That such movement shall be confined to five-leafed pines grown from seed in a location within 1 mile of which there have existed no European black currant plants and within 1,500 feet of which there have existed no currant or gooseberry plants of any variety since the time of planting said seed."

It is of interest to note that in spite of the educational work which has been carried out for years to impress nurseries with the value of growing white pine under Ribes-free conditions, none so far have been found to comply in full with the requirements in this respect. No permits have therefore yet been issued for the interstate shipment of white pines from the heavily infected areas named.

The spread of the blister rust in Michigan, Pennsylvania and New Jersey during the summer of 1927 placed those states in the same general category as Wisconsin and Minnesota with respect to intensity of infection, and five-leafed pine movement from the latter two states to the three former is no longer prohibited.

An important change from the standpoint of nursery convenience consisted of the authorization of the interstate shipment of cultivated red and white and mountain currant and cultivated gooseberry plants from infected states without a Federal permit and without environs inspection. This is expected to decrease the number of purely technical violations of the regulations. The plants are still required to be dipped in lime-sulphur solution of specified strength and to observe certain limitations in regard to dormancy and defoliation, and the dates within which shipments may be made.

The shipment of permitted Ribes from Oregon and Washington is authorized during the period from November 1 to April 1, but "if shipped in the fall the said plants (must be) defoliated and if shipped in the spring they (must be) free from leaves of the previous season's growth: Provided, That, if shipped in the spring after * * * March 1 * * * the said plants shall be completely dormant". In the case of shipments from Idaho and the eastern infected states, the dates are from September 20 to May 15 inclusive, with the dormancy requirement in effect after April 15.

The objects of the present shipping-date provisions are to prevent the distribution of blister rust on (a) the previous season's possibly infected leaves, and (b) the young leaves in the spring which might become infected with aeciospores after the latter are released by the pines in April (March in the case of Washington and Oregon).

These changes in the Ribes-shipping requirements appear to offer no increase in the risk of spread of the blister rust, as investigations by the Bureau of Plant Industry have proven the value of the lime-sulphur dip for the disinfection of currant and gooseberry plants, and the dormancy and defoliation requirements are more closely related to the biology of the disease than heretofore.

The next features of quarantine administration which interest us this afternoon are those of methods and results. The plan followed is known as transit inspection. Under this system, parcels containing plants are examined at the principal railway and mail distribution centers of the United States.

Express, parcel post, and freight shipments from any particular point in the United States destined to any other point follow certain prescribed and predetermined routings. Nearly all shipments to any great distance will be found to pass through certain distribution points. It is almost impossible for example for interstate shipments of any kind from East to West, or West to East, across the upper Mississippi Valley to avoid passing through one or more of the points of St. Paul, Omaha, Kansas City, and Chicago. At each of these points it must usually change railroad. Inspectors stationed at those points can work out schedules by which practically all such shipments may be seen at some time during the transfer process.

At the more important distribution points, the inspection problems are intensified by the large number of railway stations, post offices, and freight yards in the city. At Chicago, where more interstate shipments are transferred than anywhere else in the country, there are fifteen express, ten mail, and two hundred fifty freight inspection points. By a careful study of train schedules, distribution routes, and the territory through which trains run, it has proven possible for four or five inspectors to see practically all plant shipments moving through the city by mail or express. The railroads have been cooperating in connection with freight by furnishing copies of waybills of nursery stock shipments from one to four days in advance of arrival. It is thus possible for the inspectors to determine which freight shipments they desire to see and make only such visits to freight stations as are necessary.

The adoption of this plan of transit inspection by the blister rust office was due to the discovery in 1920 that the blister rust quarantine was being generally violated by nurseries and individuals. At Kansas City and St. Louis there were found, as a result of twelve days of work, thirty-two violations of the blister rust quarantine out of 2,680 shipments observed en route. This is in the proportion of twelve violations per 1,000 shipments. Estimating 50,000 plant shipments moving across the quarantine line at that time, the figures indicated that there were probably 600 violations of quarantine No. 26 during the year 1920.

Beginning in 1921, inspection has been maintained each year at all or most of the following points: Chicago, St. Paul, Omaha, Kansas City, Spokane, Seattle and Portland. Brief visits have been made to other distribution points. Unfortunately, this small number of points means that the work is still to a large extent a sampling process. The following summary of the results shows the work to be so valuable, however, that it is clear that fairly complete protection can be secured by an expansion of the program:

Summary of Results, 1920 - 1927.

Shipments inspected	709,954
Blister rust violations	1,102
Violations per 1,000 shipments, 1920	12
" " " " 1924	1.8
" " " " 1927	1.1
Percentage of violations by nurserymen, 1920	89
Percentage of violations by nurserymen, 1927	54

It will be noted that inspection carried on over a period of seven years time has resulted in greatly reducing the number of violations per 1,000 shipments inspected as well as the percentage of violations by nurserymen. It is estimated that from 75 to 85% of the total shipments passing through the transfer points were inspected. The improvement is especially striking in view of the continually increasing efficiency in the detection of violations.

All the violations listed in the above table were of the blister rust quarantines. As the inspectors were paid from blister rust funds, little attention was at first paid to searching for violations of other quarantines. However, authority was given them to intercept violations of other Federal plant regulations, and in the calendar years 1927 and 1928 the following violations were reported:

	1927	1928 Incomplete
Violations of Quarantine No. 38 (Black Stem Rust)	2	7
Violations of Quarantine No. 43 (European Corn Borer)	0	2
Violations of Quarantine No. 45 (Gipsy and Brown Tail Moths)	7	20
Violations of Quarantine No. 48 (Japanese Beetle)	55	31
Violations of Quarantine No. 53 (Satin Moth)	21	17
Violations of Quarantine No. 62 (Narcissus Bulb)	0	189
Violations of Quarantine No. 63 (White Pine Blister Rust)	289	232
Total	374	498

It is worthy of note that of the 55 violations of Quarantine No. 48 (Japanese Beetle) several of the shipments from heavily-infested territory had from 2 to 10 lbs. of earth around the roots of the plants--a dangerous condition. These violations originated for the most part in or adjacent to Philadelphia and nearby New Jersey points where infestation is severe.

The part which transit inspection plays in preventing the spread of insect pests is that of a second line of defense. Quarantine administration divides itself naturally into four phases: (1) scouting to determine the proper location of quarantine lines; (2) internal inspection to determine freedom of shipments from infestation; (3) road station maintenance to control vehicular traffic in the restricted articles; (4) transit inspection to provide for the return or other disposal of articles which escape surveillance of the inspectors inside the infested area and would reach destination unless intercepted. The importance of transit inspection is much greater than is indicated by the number of violations discovered, for almost every such violation represents a long distance shipment from infested territory and therefore one of an especially dangerous nature.

The first two or three phases of quarantine administration listed are of necessity carried out by specialists in the pest concerned. The responsibility for scouting and inspection on account of the gipsy moth, for example, must be laid on those who are especially familiar with the various stages of that pest. Transit inspectors, however, do not attempt to determine infestation of the products intercepted, but to decide whether the shipment is in compliance with quarantine restrictions. They are specialists in traffic, routing and train schedules. Their place in the program is similar to that of the traffic management or shipping department in a business. They must familiarize themselves with all the fine points of quarantine restrictions and railroad routings. Their success depends on the tact and diplomacy with which they secure the cooperation with freight, express and postal officers and employees, and the skill they use in locating plant shipments en route.

For these reasons it is the hope and desire of the Department to establish transit inspection as a separate organization, definitely responsible for the interception of articles which escape from infested areas in violation of any domestic quarantine. At present the blister rust organization is carrying on the work on a limited scale, but a comprehensive independent organization of national scope is planned for the future and should result in greatly increased protection.

The forest interests of the Northwest will gain from such an organization more complete protection against the importation and spread of such important forest pests and diseases as the gipsy moth, brown tail moth, satin moth, white pine blister rust, and the Woodgate rust, as well as the larch canker, if a Federal quarantine is later established against that disease.

This Conference is so familiar with the various phases of man's long battle against insect and plant disease losses that it is perhaps scarcely necessary to express my concluding thought. It is this: The most economical method to fight a pest is never to permit its introduction into

the region where it will be injurious. If this attempt is unsuccessful, the next effort should be to eradicate it completely. Only when both of these plans of operation are no longer feasible is it necessary to endure the continuous drain on a country's resources which the losses caused by and the costs of control of a serious pest entail.

* * *

Mr. Barss: Before adjourning for lunch I desire to appoint Messrs. Chapman, McDaniels and Joy on the Resolutions Committee. This meeting will convene at 1:15 p.m.

AFTERNOON SESSION

The meeting was called to order by Mr. Barss at 1:45 p.m.

THE PRESENT SITUATION AND NECESSARY ACTION

by

H. P. Barss

The speakers who have preceded me have made clear the present situation. During the past season the disease has swept far beyond its previous limits, has spread over the finest western white pine forests of the Pacific Coast, has established itself on pine south of the Columbia River gorge along the ridge of the Cascade Mountains and has pushed its front line forward to within a stone's throw of the northern limits of the sugar pine. Although this advance may have been perhaps stronger in its intensity than some of us had expected, we who have watched its progress in years past were not entirely surprised by what has taken place.

It is clear to all that the time for concerted and coordinated action has come. The intensive program of reconnaissance, of research on the disease and of investigation into the best methods of control which has been carried forward during the last few years has prepared us well for the active campaign that is ahead. We now are certain that the permanent preservation of our white pine resources can be accomplished in spite of the existence of this disease in the region. It is equally certain that it is the responsibility of the nation and of the state and of ourselves as individuals to see to it that the necessary active measures are now taken (1) to protect these resources, and (2) to continue the investigations that are needed to guide those who must carry forward the active campaign.

Coordination: The most important problem which, as I see it, must be considered by the Conference at this juncture is the problem of working out a practical plan of coordinating the control efforts thruout the western white pine region in such manner as to bring about effective, unified eradication work. The control work in the National Forest areas, in the state forest land and in the private holdings must

be conducted under a carefully devised system in which all agencies will cooperate in such a way that the efforts of each one will supplement and make effective those of the rest. It seems to me that this might be brought about if the Forest Service on the one hand with its responsibility for the national forests, and the State Foresters of the states concerned on the other hand, acting for the state-controlled lands and on behalf of the private timber owners within their domain, can jointly develop a program of concerted control operations which step by step will cover the territory to be protected. Such a program will be a permanent program. The work of the successive years would be planned out in the beginning and modified by mutual agreement whenever modifications became necessary. We all realize how seriously the permanent protection of these forests would be impeded by lack of coordination. We see the menace which would be created if islands of unprotected land were left to develop as centers of blister rust intensification in the heart of eradicated areas. So there seems to be no other way out. A comprehensive plan of organization must be arrived at whereby these dangers are avoided. This Conference should back up such a plan by its united support. Now is the time. Delay is costly.

Stream-type Eradication: The enormous importance of launching the first attack on the blister rust by eradication of the stream type aggregations of susceptible species of Ribes has been brought clearly before us. I believe that this Conference should call attention to the necessity of concentrating action on the stream type as the first and most effective blow that can be dealt against intensification of the disease in the areas to be protected.

Appropriations: As in the past, this Conference, representing as it does the private, state and national timber interests affected by the invasion of the white pine blister rust in the West and representing also the national and state agencies concerned in its control, must again call upon the National Congress to continue the Federal financial support without which our protection against this disease cannot be accomplished. We must urge the states involved to enlarge their appropriations in order to make the control work effective. We must call upon the private interests for a full measure of support. The investigational work must be continued. The sugar pine interests must not be neglected. Cheaper and better methods of eradication must be developed. The disease must be constantly watched.

"Transit" Quarantine Inspection: Now that the Federal Plant Quarantine organization has been modified so as to create an Office of Domestic Quarantines I believe that this Conference should urge the development within the Office of Domestic Quarantines of a permanent organization for "transit" inspection as an important safeguard to all internal quarantines that are now in force or which may in future be established.

In conclusion I would suggest that steps be taken to replenish the exhausted treasury of this Conference. The amount required for its incidental expenses is small. It is, in fact, insignificant in proportion to the value of the services rendered. Only a few hundred dollars are needed, for most of our work is done without cost by the volunteer efforts of public-spirited members.

* * *

Mr. Barss: We shall now consider the larch canker situation and what is to be done about it. The Executive Committee of this Conference has asked Mr. Humiston to investigate this problem and confer with Government officials regarding it. We shall now have a report from Mr. Humiston on the results of his investigation.

Mr. Humiston: During my visit to Washington I conferred with the Secretary of Agriculture, Mr. Jardine; with Dr. Woods; with Mr. Stewart, Chief Forester; and with General Lord of the Budget. I also went to Boston and in company with several Government and state officials drove to Providence, Rhode Island, to inspect the larch canker infection on the Goddard estate. I saw the larch canker on Douglas fir. The fir trees were planted in clumps, from 100 yards to one-fourth mile apart and were 10 to 15 inches in diameter. These clumps were all infected. Dr. Metcalf told us at the Conference last year of only one area being infected. Now there are five or six.

Larch canker is a very virulent, deadly disease. When it attacks a tree it either kills it or badly distorts it. The tree literally bleeds to death. I saw puddles of pitch at the bases of the attacked trees that were two to three feet in diameter and inches deep. The state and Federal agencies are doing nothing to check spread of this disease. There is a continuous natural stretch of susceptible hosts extending across the continent. The pathologists told me that the disease is more virulent in this country than it is in Europe. They also surmised that it would be even worse under the more humid conditions in the West.

It is my conviction after investigating this situation that the potentialities for damage to the Douglas fir, yellow pine and spruce are greater than that of fire and all other hazards. It spreads from tree to tree but the distance of spread is not known. We should grapple with this problem immediately.

As a result of conferences with coast Douglas fir owners a tentative suggestion for action has been developed. There is only a small area infected in Massachusetts and Rhode Island. The disease strikes quickly and makes a wreck of the tree. Need for action is imminent and it has been thought that we should send someone East to see whether or not arrangements can be made with the Government and state officials to eradicate the known infection during the time that Congress is considering the matter. It should be cleaned up as quickly

as possible. By immediate action I believe that it can be stopped while it is in an incipient stage.

Mr. King: What is the extent of the infection?

Mr. Humiston: It is thoroughly scattered over 600 acres where I saw it.

Mr. Chapman: I want to remind you of one thing. The Federal Government cannot go into Massachusetts and Rhode Island and clean up. We can get a Federal appropriation, but this does not solve the problem. Massachusetts and Rhode Island must authorize the cleanup. It occurs on estates of influential Boston people and they are not willing to permit removal of their trees. The states are slow to exercise their police power. These states have promised to do it but have failed to act. They need a little stimulation. If a Federal appropriation is secured, the Federal agencies could destroy infected trees but they must have state authority. Would you think, Mr. Humiston, that it might be well for us to ask the National Manufacturers Association to see whether or not they can start something?

Mr. Humiston: I think that would be a good idea, but someone should go back immediately and try to get action.

Mr. Chapman: One attorney of Boston who owns one of the estates on which infection occurs stated that anyone intending to destroy such infected trees could come on his land only through an order by the court.

Mr. Barss: This is one of the most serious problems we have faced. The whole West should show its interest and bring it clearly before Congress so that the future safety of our timber be made certain right now. This Conference should ask the Bureau of Plant Industry to report back to this Conference next year on the progress which has been made with regards to the larch canker.

Mr. Humiston: We should get it cleaned up while Congress is considering what action it should take. Eliminate it this winter and then let Congress vote the $30,000 for follow-up work. We have our chance now if we will act.

Mr. Allen: Mr. Humiston has presented a new idea, that is, of sending an ambassador to these states. It might or might not work but could do no harm.

Mr. Wyckoff: I have information that $10,000 of the larch canker appropriation will be made available immediately.

Mr. Joy: It seems that someone should go East, arouse to action the Bureau of Plant Industry, go to the infected areas and stay there until the situation is cleaned up.

Mr. Barss: What are the ways and means if it is intended to raise funds among the timbermen?

Mr. Joy: Someone should solicit funds among the timbermen of the Pacific Coast.

Mr. Humiston: It is not my thought that this organization should take any action. I just wanted to inform the Conference regarding the problem.

Mr. Bush: Why not have this Conference appoint the man to do this? Also have this man carry credentials from the governors of the western states and from British Columbia. This is a serious situation. The extermination of our stands is threatened. It is more serious than fire.

Mr. Allen: Will it not be satisfactory if this appropriation is passed, part of it made immediately available, and the Bureau of Plant Industry start at it immediately and get results by March?

Mr. Humiston: Time is the thing of utmost importance. It should be cleaned up immediately. Fall the trees now while the ground is frozen so that the spores will not be distributed and infect other trees.

Mr. Dean: The heads of the State Departments of Agriculture are now in session at Chicago. Mr. Gilbert of Massachusetts is probably in attendance. Would it not be well for us to wire our commissioners there to take this matter up with the commissioners of Massachusetts and Rhode Island?

Mr. Fracker: Some action is being taken. Some of the visibly infected trees have been destroyed. Mr. Gilbert does not have authority to condemn trees which are not visibly infected.

Mr. Chapman: Following up Mr. Dean's suggestion: Messrs. Dean, Humiston and Bush might wire Mr. Welch to take up this matter with Mr. Gilbert. Mr. Humiston's suggestion is still in order. Someone should be sent East representing all of the western organizations so that he be thoroughly representative.

Mr. Barss: How would it be to have our Secretary call this matter to the attention of the other organizations on the Coast and try to arrange to have someone sent back?

Mr. Humiston: I move that our Secretary be appointed to take up this matter of the larch canker and the sending of a man East with the other interested organizations.

Mr. Hubert: Second the motion.

Motion was passed.

Mr. Barss: Are there any other remarks on the larch canker? Since there are no further remarks or business I shall ask Mr. Chapman to read the resolutions.

The following resolutions were adopted and the Conference adjourned.

RESOLUTIONS ADOPTED BY THE WESTERN WHITE PINE BLISTER RUST CONFERENCE

* * *

APPRECIATION

We, the members of the Western White Pine Blister Rust Conference, hereby express regret that Charles A. Park, who has directed our sessions annually from the beginning has been prevented from attending this Conference, and we individually and collectively send him our heartiest regards and our appreciation for his long and effective services.

APPROPRIATIONS FOR CO-OPERATIVE AND NATIONAL FOREST ERADICATION WORK

In 1928, white pine blister rust made its first and widespread invasion into the most important belt of western white pine, and the same season spread southward to a point close to the northern extension of sugar pine. Investigations under the Bureau of Plant Industry have demonstrated that control of the disease and permanent protection of these great national resources is practicable. The contemplated control campaign must, however, be launched at this time. The appropriation contemplated by the budget which has been presented to Congress is not adequate for this purpose because of the rapid spread of the disease. In view of the declaration by white pine owners to substantially support actual control measures and the early meeting of our state legislatures it is therefore earnestly requested that a sum in the amount of $65,000 be added to the budget estimates for western blister rust control by the Bureau of Plant Industry, and that $100,000 be appropriated whereby the United States Forest Service may undertake the control measures on National Forests.

STREAM TYPE ERADICATION

The Western White Pine Blister Rust Conference hereby expresses its conviction that the most effective protection of the western white pine forests against blister rust can best be accomplished by the immediate eradication of Ribes (currants and gooseberries) in the stream type according to a carefully considered program to be followed by and supplemented by such other methods as may be required.

COORDINATION

The Western White Pine Blister Rust Conference urges that all efforts to control white pine blister rust be conducted by coordinated action in order to permit the development of the unified campaign which is necessary to greatest effectiveness at least expense, and which is essential to permanent protection.

TRANSIT INSPECTION IN QUARANTINE ENFORCEMENT

Since the enforcement of the blister rust quarantine is a fundamental part of the program to control white pine blister rust and protect such

white and sugar pine stands as are still free from this disease and those in which control operations are in progress, and

Since other serious forest pests such as Brown Tail moth, satin moth, Woodgate rust, and Larch canker are pests which may invade our western forests, and if so introduced would cause enormous damage, and

Since the system of transit inspection which has been developed in connection with the enforcement of the blister rust quarantine has proven highly efficient and would be of value in the enforcement of other quarantines established for the protection of this region,

Therefore, the Western White Pine Blister Rust Conference urges that this method of quarantine enforcement be continued, that it be extended to provide a more efficient and complete enforcement of other quarantines in order to give the western states the maximum protection against the introduction of these pests and that adequate funds be provided to enable the Plant Quarantine and Control Administration of the United States Department of Agriculture to establish a comprehensive system of quarantine enforcement of this kind.

EUROPEAN LARCH CANKER

We earnestly urge the eradication in its incipient stages, of the European larch canker now present in Massachusetts and Rhode Island. This damaging fungus disease attacks Douglas fir, western yellow pine, western larch and probably Sitka spruce, our principal commercial tree species. Introduction of this disease into our western forests should be prevented in the interest of economy and to prevent damage to one of our chief resources. Adequate funds should at once be provided by Congress to efficiently deal with this threatening disease.

FUNDS FOR CONFERENCE TREASURY

Since the work of this Conference has been financed by small contributions from interested individuals and associations, and since the treasury is now nearly exhausted, the Western White Pine Blister Rust Conference hereby authorizes the solicitation of further contributions and urges a generous response, so as to enable the Conference to continue its efforts to assure the preservation of western forests against disease.

APPRECIATION

We desire especially to thank Mr. W. D. Humiston of Potlatch Lumber Company, Potlatch, Idaho, for his endeavors in Washington, D. C. to bring before government officials the needs of western work as this pertains to our forests and forest industries, and for the time he devoted to personal inspection of the damage brought about by attacks of larch canker and white pine blister rust in eastern states.

We endorse and commend the manner in which the Federal Office of Blister Rust Control, Office of Forest Pathology and Plant Quarantine and Control Administration have undertaken and carried forward their work and also express appreciation for the support and advice of the Federal Forest Service, state authorities and private organizations, all of whom have been active in attempting to prevent spread of the blister rust disease.

ATTENDANCE OF WHITE PINE BLISTER RUST CONFERENCE

1. George C. Joy, State Supervisor of Forestry, Olympia, Washington.
2. V. O. Wallace, Washington Forest Fire Association, Chehalis, Washington.
3. C. S. Cowan, Washington Forest Fire Association, Seattle, Washington.
4. T. O. Buchanan, Office of Forest Pathology, Portland, Oregon.
5. J. W. Kinney, Office of Forest Pathology, Portland, Oregon.
6. C. R. Stillinger, Office of Plant Quarantine and Control Administration, Spokane, Washington.
7. Thorton T. Munger, Pacific Northwest Forest Experimental Station, Portland, Oregon.
8. S. N. Wyckoff, Office of Blister Rust Control, Spokane, Washington.
9. C. N. Partington, Office of Forest Pathology, Portland, Oregon.
10. H. P. Barss, Oregon State College, Corvallis, Oregon.
11. H. G. Lachmund, Office of Forest Pathology, Portland, Oregon.
12. E. E. Hubert, School of Forestry, Moscow, Idaho.
13. Geo. M. Cornwall, THE TIMBERMAN, Portland, Oregon.
14. Elers Koch, United States Forest Service, Missoula, Montana.
15. Fred Ames, United States Forest Service, Portland, Oregon.
16. C. S. Chapman, Weyerhaeuser Timber Company, Tacoma, Washington.
17. Ben E. Bush, State Forester of Idaho, Moscow, Idaho.
18. S. B. Fracker, Department of Agriculture, Washington, D. C.
19. C. C. Strong, Office of Blister Rust Control, Spokane, Washington.
20. L. E. Bozarth, Plant Quarantine, Portland, Oregon.
21. J. D. Guthrie, U. S. Forest Service, Portland, Oregon.
22. J. P. Weyerhaeuser, Tacoma, Washington.
23. E. T. Allen, Western Forestry & Conservation Association, Portland, Ore.
24. W. D. Humiston, Potlatch Lumber Company, Potlatch, Idaho.
25. P. S. King, Oregon State Forester's Office, Salem, Oregon.
26. M. L. Dean, Director, Bureau of Plant Industry, Boise, Idaho.
27. J. H. Walker, Crown-Willamette Pulp & Paper Company, Portland, Oregon.
28. E. S. Collins, Ostrander Ry. & Timber Company, Portland, Oregon.
29. John Woods, Long Bell Lumber Company, Longview, Washington.